

**REMARKS/ARGUMENTS**

Reconsideration of the present application, as amended, is respectfully requested.

**A. STATUS OF THE CLAIMS**

As result of the present amendment, claims 18-19 remain in the case for continued prosecution.

Claims 1-17 are withdrawn.

Claim 18 has been amended to set forth what Applicants believe to be their invention. Support can be found, for example, from page 10 line 4 to page 12 line 10.

Claim 19 has been amended to remove informalities.

No new matter has been added.

**B. AMENDMENTS TO THE DRAWINGS**

At item 6 on pages 2-3 of the Office Action, some of the drawings (Figures 6, 9-14) are objected to due to lack of clarity. In response, Applicants submit replacement drawings. In the replacement drawings, each Figure is placed in a each separate sheet and orientation of several Figures has been changed to enhance the clarity. More specifically, Figures 2-5 and 9-16 are now placed in separate sheets and Figures 9-15 are now in landscape orientation. Thus, total 17 replacement sheets are submitted herein. No new matter is added. It is urged that the replacement drawings are in proper form.

As a result of the amendment and the reason above, thus, the Applicants respectfully request this objections being withdrawn.

**C. SEQUENCE RULES**

At item 7 on page 3, the Examiner indicated that Figures 9-14 failed to comply with the requirements 37 CFR 1.821-825. In response, specification has been amended to insert SEQ ID NOs, where appropriate, in the Figure Descriptions for FIGs. 9-14 on pages 25-28. In addition, a Substitute Sequence Listing in a Computer Readable Form (CFR) is submitted herein, along with a text file of the Sequence listing to provide SEQ ID NOs for

any additional sequences in Figures 9-14. It is urged that the substitute CRF copy is in compliance with the requirement.

As a result of the amendment and the reason above, thus, the Applicants respectfully request this objections being withdrawn.

**D. REJECTIONS UNDER 35 USC § 112, FIRST PARAGRAPH**

At item 9 on pages 3-4, claim 19 is rejected under 35 USC § 112, first paragraph, as failing to comply with the enablement requirement. The Examiner indicated that the instant specification on page 47, lines 7-12, provides information on the deposit of Accession No. KCCM-10460 at Korean Culture Center of Microorganisms, an accepted International Depository Authority, however, lack certification of deposit criteria set forth in 37 CFR 1.801-1.809. In response, Applicants submit a Declaration of Depositor by one of the Applicants and a copy of the Deposit Certificate.

As a result of the amendment and the reason above, thus, the Applicants respectfully request this rejection being withdrawn.

**E. REJECTIONS UNDER 35 USC § 112, SECOND PARAGRAPH**

At item 10 on pages 4-5, claims 18-19 are rejected under 35 USC § 112, second paragraph, as allegedly being indefinite. The Examiner indicated that the spelling of “astaxanthine” in claim 18 should be “astaxanthin.” Without admitting the appropriateness of the Examiner’s position and for the purpose of facilitating prosecution, claim 18 has been amended to change “astaxanthine” to “astaxanthin.” Furthermore, the Examiner suggested amending the language of claim 18 as to “transformed with a 16S rDNA nucleotide sequence of SEQ ID NO: 3.” Claim 18, as amended herein, is directed to an isolated and purified microorganism, *Paracoccus haeundaesis*, which contains a 16S rDNA nucleotide sequence of SEQ ID NO: 3, not transformed with SEQ ID NO: 3. Thus, claims 18 and 19 have been amended accordingly.

As a result of the amendment and the reason above, thus, the Applicants respectfully request this rejection being withdrawn.

**F. REJECTIONS UNDER 35 USC § 101**

At item 12 on pages 5, claims 18-19 are rejected under 35 USC § 101, as allegedly being non-statutory subject matter. The Examiner indicated that the naturally existing strains are considered non-statutory subject matter. Applicants respectfully traverse. The microorganism in claims 18-19, as amended herein, is isolated and purified by the Applicants, not as its natural existence. In addition, as the statue requires, the instantly claimed composition provides a new and useful improvement, thereof, i.e. producing astaxanthin.

As a result of the amendment and the reason above, thus, the Applicants respectfully request this rejection being withdrawn.

**G. REJECTIONS UNDER 35 USC § 102(e)**

At item 13 on pages 6-8, claim 18-19 are rejected under 35 USC § 102(e), as allegedly being anticipated by Berry et al. (US Patent 6,989,257). The Examiner indicated that Berry et al. teach the transformation of *Paracoccus* species with a 16S rDNA and the production of astaxanthin. The Examiner also indicated that a nucleotide sequence SEQ ID NO: 12 of FIG. 2 in Berry et al. has about 90% sequence similarity with the SEQ ID NO: 3 of the instant invention. Applicants respectfully traverse.

The claimed *Paracoccus haeundaensis* is a microorganism isolated and purified by the Applicants first time and is different from what Berry et al. taught. It is accepted and understood by those skilled in the art, 90% sequence similarity still contains large amount of difference between two microorganisms, which can be shown by many different properties of those microorganisms. Applicants respectfully would like to draw the Examiner's attention to Table 4 of the application, where it was further identified that the claimed strain is different from other *Paracoccus* species such as *Paracoccus marcusii* DSM 11571, *Paracoccus carotinifacines* E-396, etc. in many ways. One of the different properties is related to the production of astaxanthin by the claimed strain. Most of *Paracoccus* species including *Paracoccus* sp. Strain R114 in Berry et al. originally produce

only zeaxanthin, and cannot produce astaxanthin because of lack of carotenoid ketolase (*crtW*) gene. As suggested in column 78, lines 64-66 in Berry et al., astaxanthin is a commercially important carotenoid. However, no successful method or source for production of astaxanthin has been known. Berry et al. teach a method how to produce recombinant strains derived from strain R114 for astaxanthin production. However, Berry et al. also reported that even though the final recombinant strains produced astaxanthin, other unwanted ketocarotenoids are also accumulated at higher levels, thus, admitting the difficulties of producing astaxanthin. Furthermore, as described in columns 78-79, the method taught by Berry et al. requires a complex process, which only can produce a strain producing unfavorable portions of astaxanthin. On the contrary, the isolated and purified microorganism, *Paracoccus haeundaensis*, of the instant invention can produce astaxanthin in desirably high amount. See Example 6 on pages 48-49 and data on FIG. 7. Considering the different properties and the degree of the difference between the claimed microorganism and the one in the cited reference, it is urged that the instant claim is not anticipated by Berry et al.

As a result of the amendment and the reason above, thus, the Applicants respectfully request this rejection being withdrawn.

#### **H. OBJECTION FOR SPECIFICATION**

At item 14 on page 8, a hyperlink in the specification on page 43, line 15 has been objected to. In response, the specification has been amended to remove the hyperlink.

As a result of the amendment and the reason above, thus, the Applicants respectfully request this objections being withdrawn.

#### **I. FEES**

This response is being filed timely with two months extension of time and the required fee. No further fees are believed to be due. If, on the other hand, it is determined that any further fees are due or any overpayment has been made, the Assistant

Commissioner is hereby authorized to debit or credit such sum to Deposit Account No. 02-2275.

Pursuant to 37 C.F.R. 1.136(a)(3), please treat this and any concurrent or future reply in this application that requires a petition for an extension of time for its timely submission as incorporating a petition for extension of time for the appropriate length of time. The fee associated therewith is to be charged to Deposit Account No. 02-2275.

An early and favorable action on the merits is earnestly solicited.

**J. CONCLUSION**

In view of the actions taken and arguments presented, it is respectfully submitted that each and every one of the matters raised by the Examiner have been addressed by the present amendment and that the present application is now in condition for allowance.

An early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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